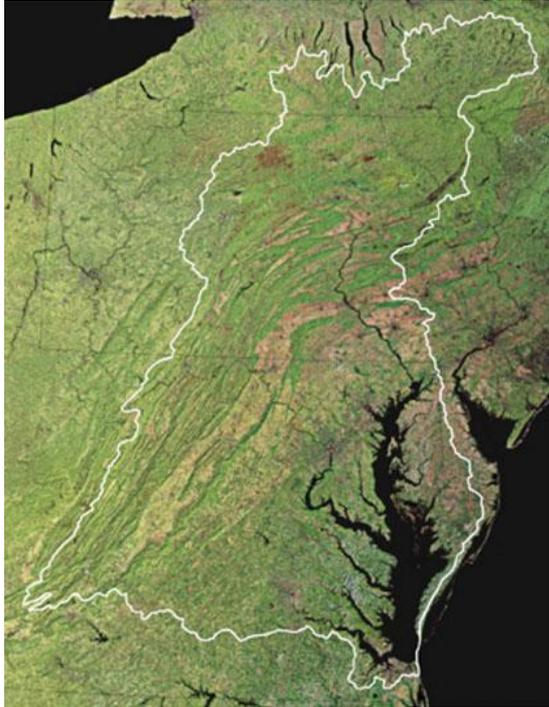
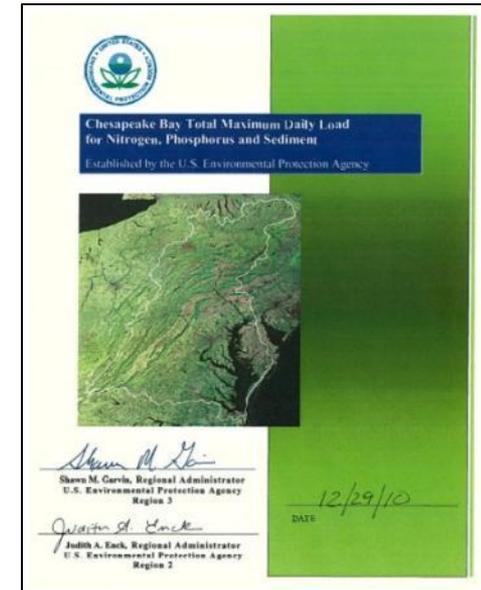


Alternative Futures: Accounting for Growth in the Chesapeake Bay Watershed



Pollution Diets, Offsets, and Alternative Futures, Oh My!



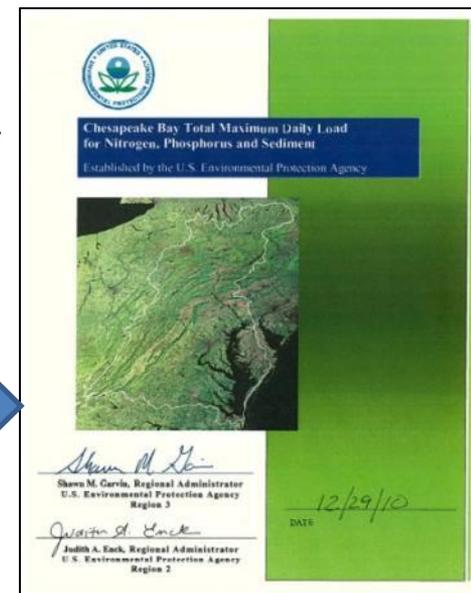
**Rich Batiuk, Associate Director for Science,
Chesapeake Bay Program Office
US EPA Region III
Annapolis, Maryland
September 15, 2011**

Alternative Futures: Accounting for Growth in the Chesapeake Bay Watershed



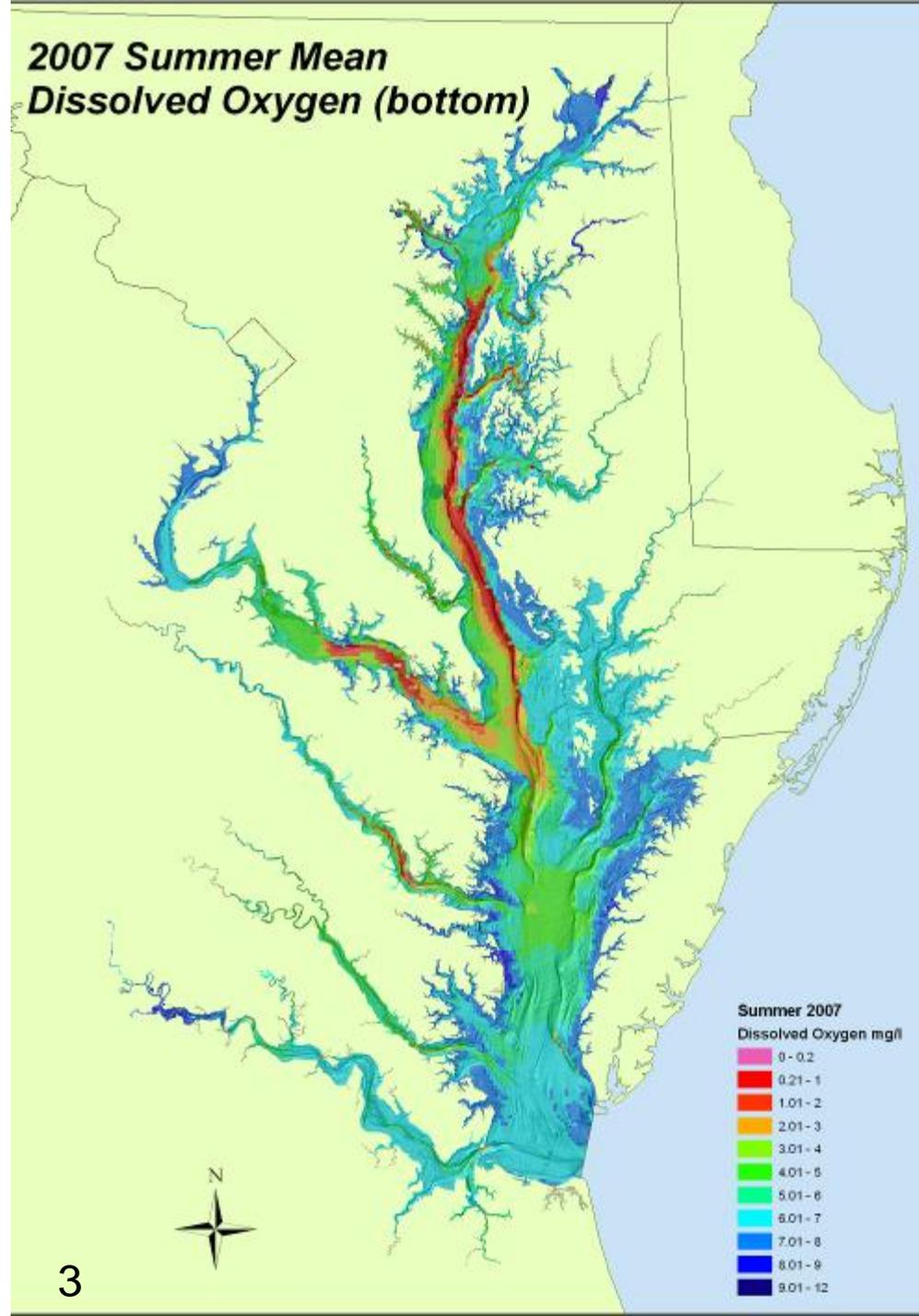
← Here's the Bay Watershed

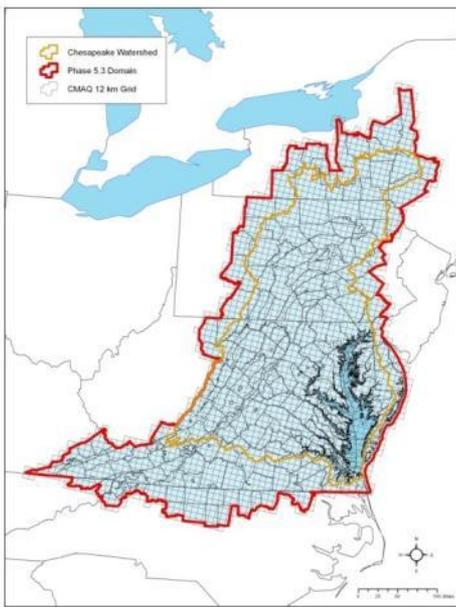
Here's the Bay Watershed on a Diet →



**Rich Batiuk, Associate Director for Science,
Chesapeake Bay Program Office
US EPA Region III
Annapolis, Maryland
September 15, 2011**

Low to no dissolved oxygen in the Bay and tidal rivers every summer....and reduced water clarity, lack of underwater grasses, harmful algal blooms (did I mention hurricanes?!?)

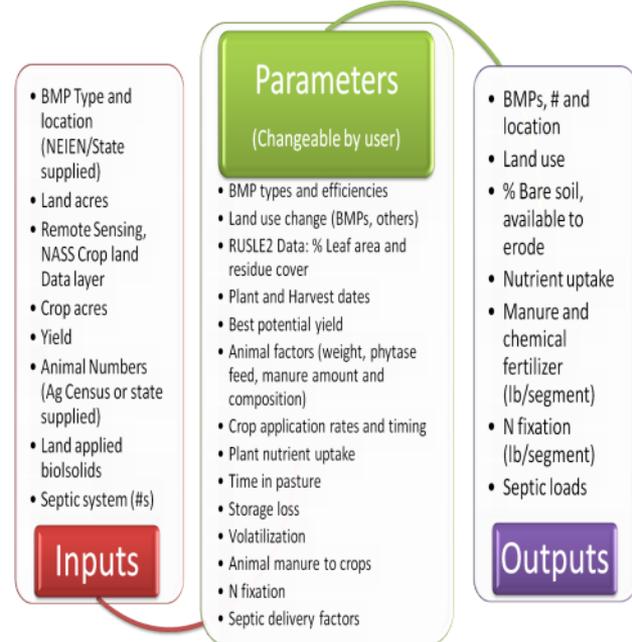




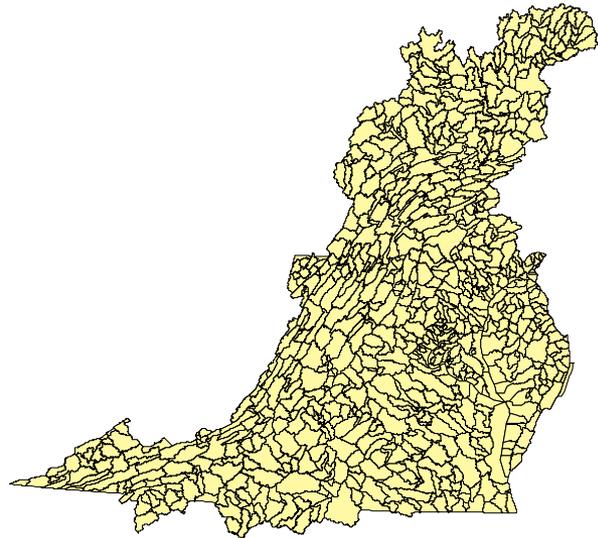
Chesapeake Bay Airshed Model



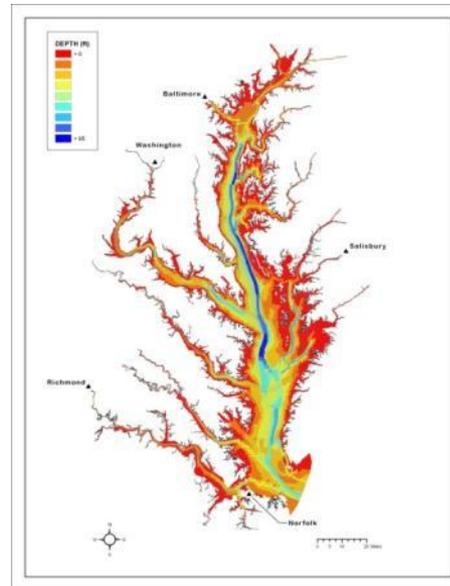
Chesapeake Bay Land Change Model



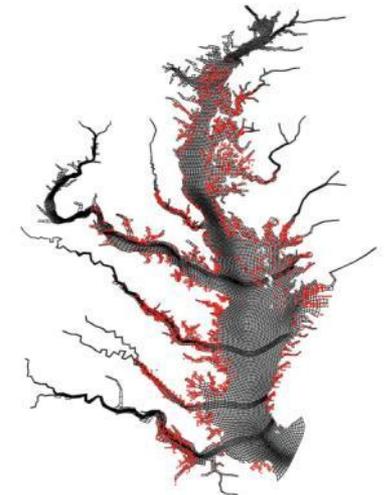
Chesapeake Bay Scenario Builder



Chesapeake Bay Watershed Model

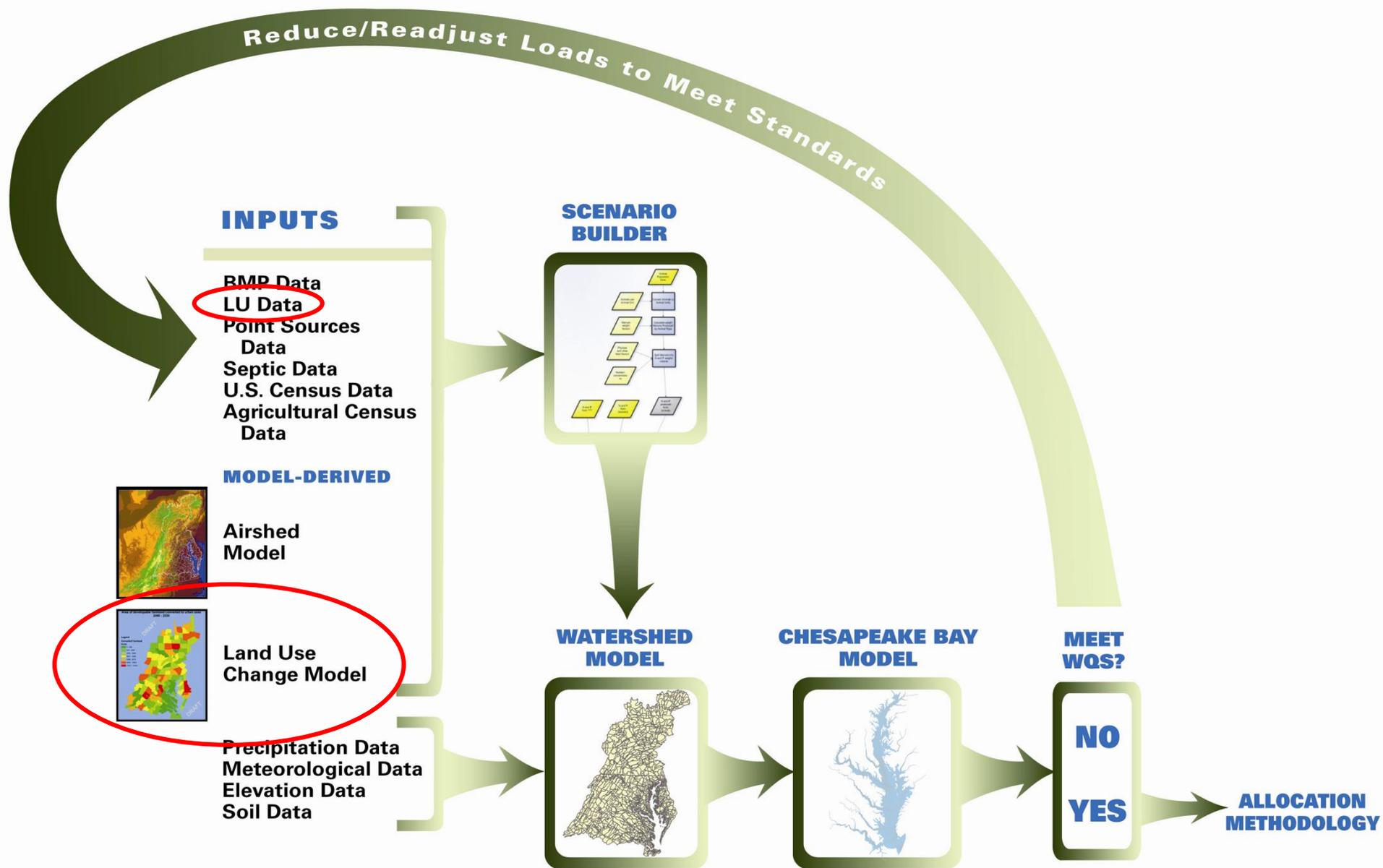


Chesapeake Bay Water Quality and Sediment Transport Model

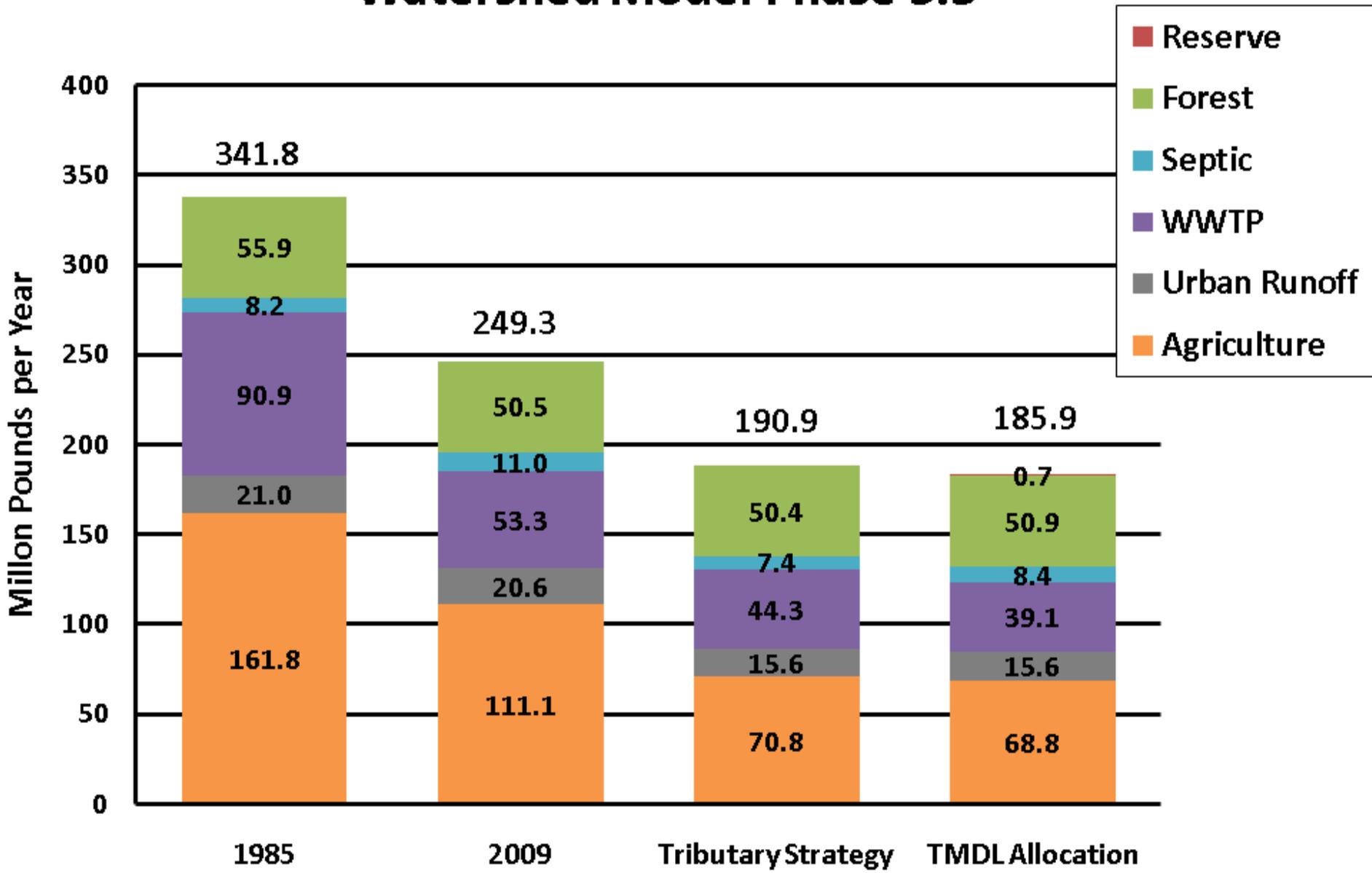


Chesapeake Bay Filter Feeder Model

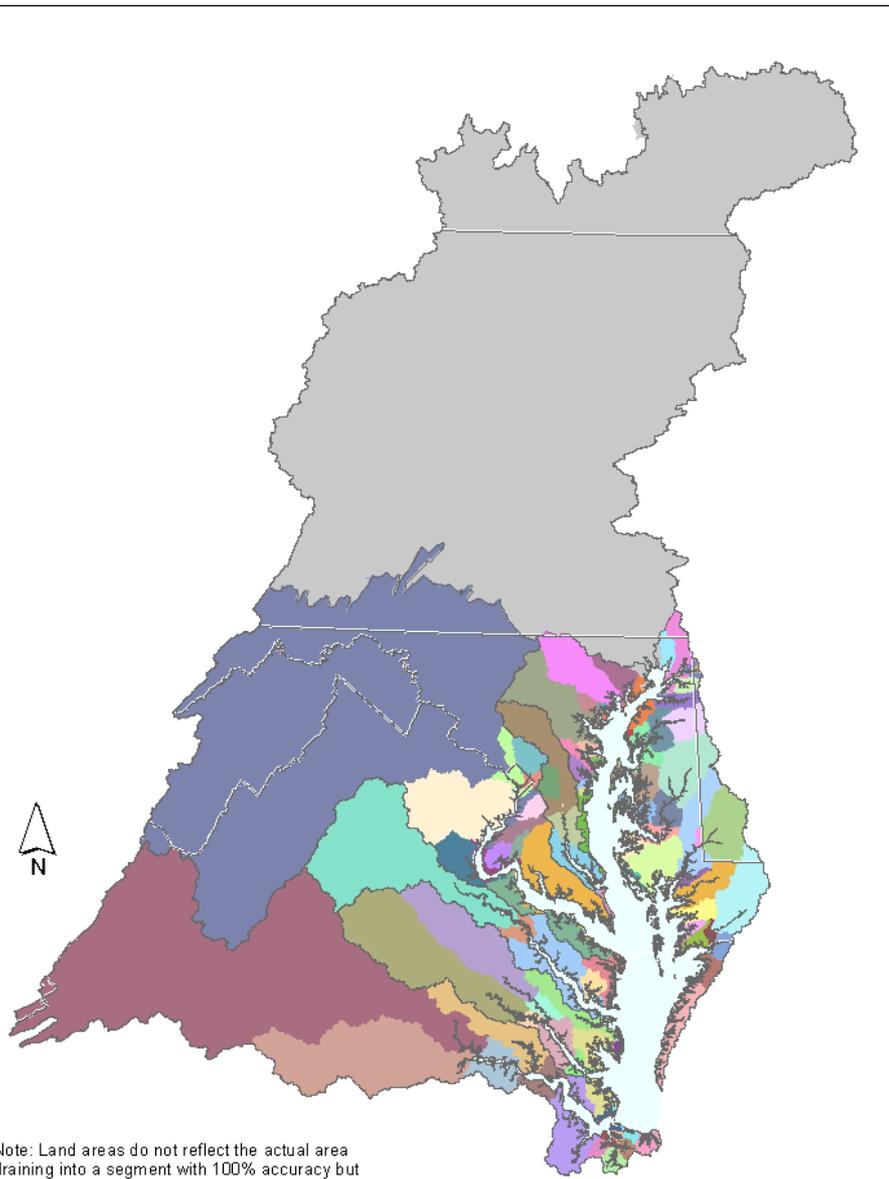
Suite of Models/Tools Used in Bay Restoration Decision-making



Nitrogen Loads by Source Sector and Scenario - Watershed Model Phase 5.3

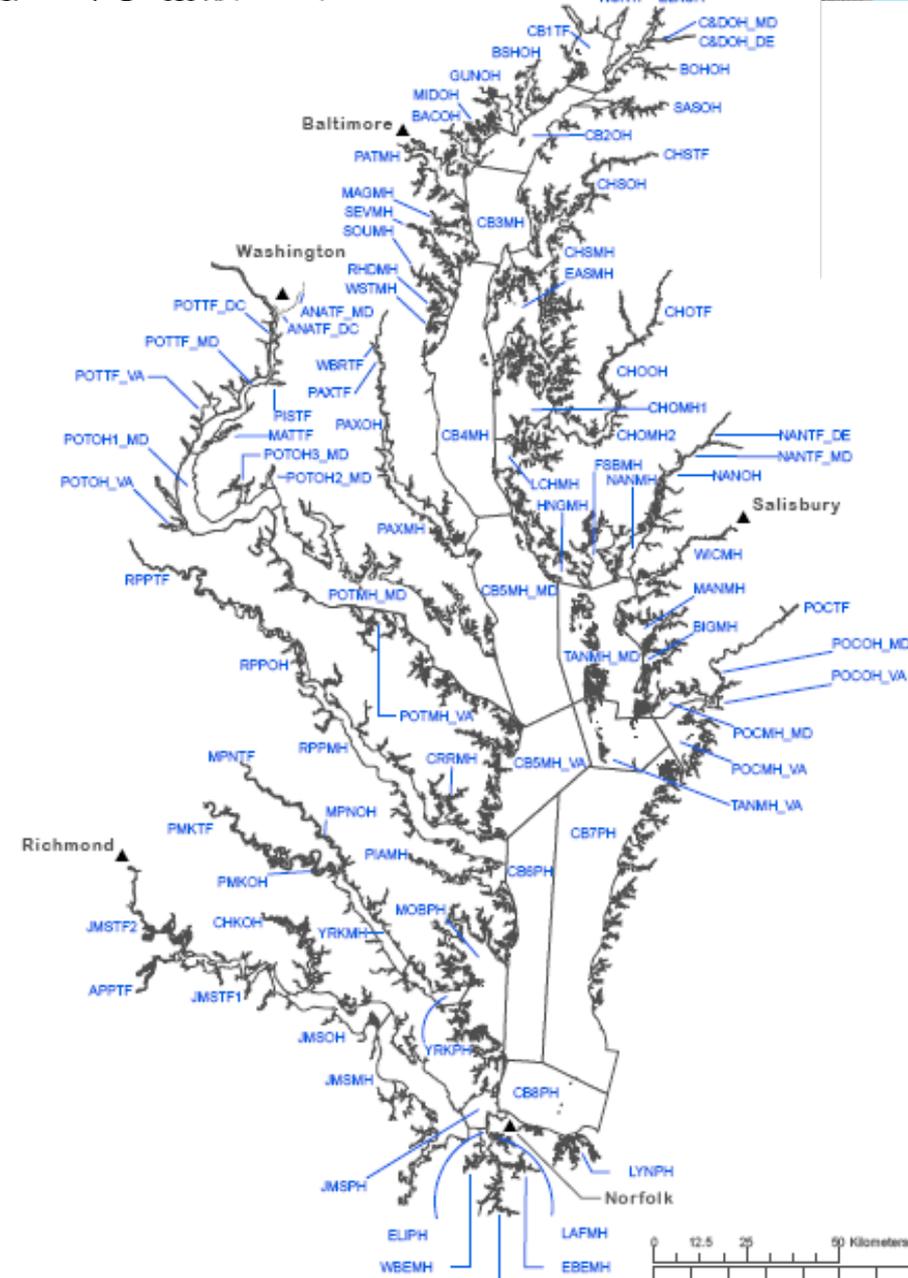


Pollution Diet for Each Tidal Water Segment



Note: Land areas do not reflect the actual area draining into a segment with 100% accuracy but are basically correct at the map scale.

Created 09/24/09 by HW. 0 20 40 60 Miles



Jurisdictions' Watershed Implementation Plans

Plans

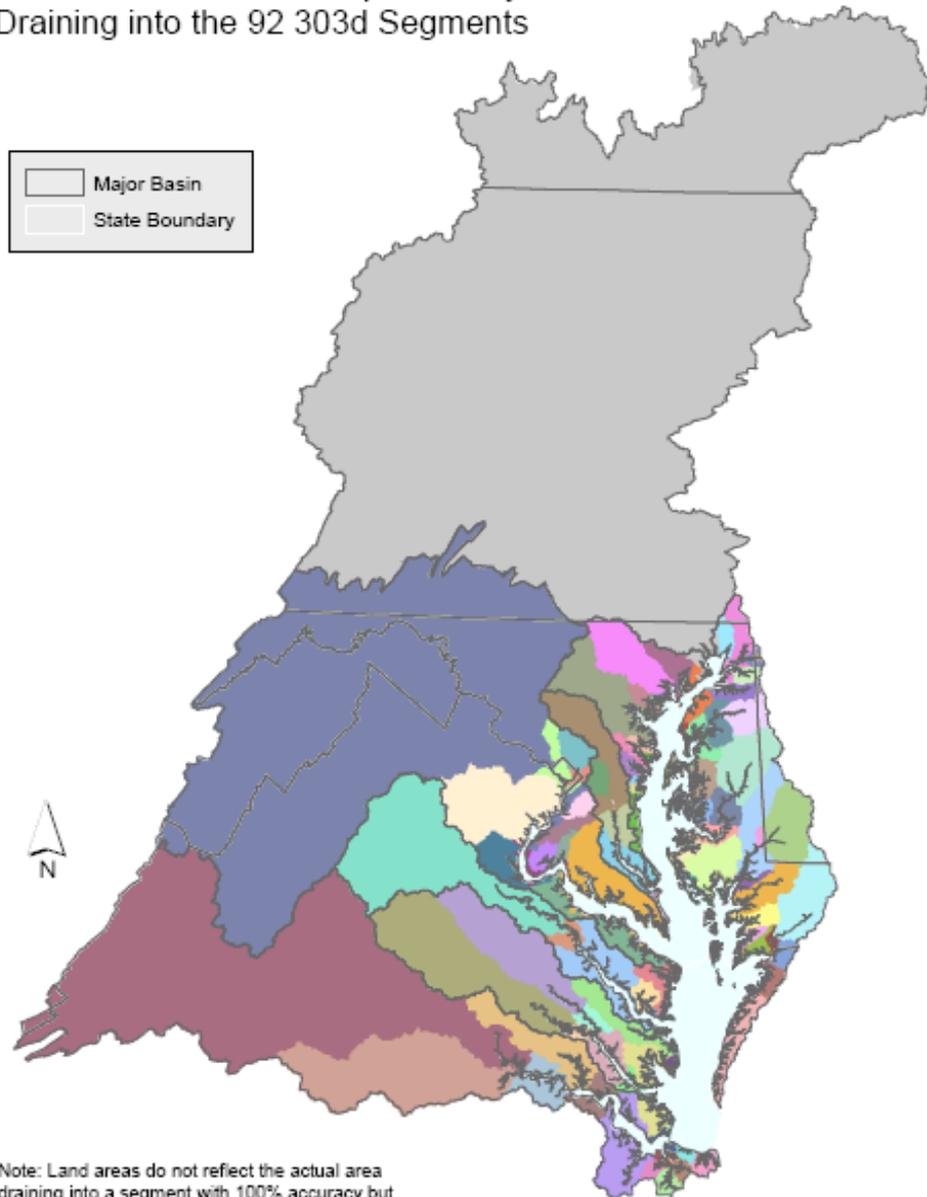
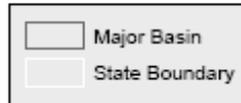


92 Individual TMDLs

Table B2. Format for Submitting Phase I Watershed Implementation Plan Outputs

| St. | Maj. Basin | Impaired Segment Drainage | Unique Code | Source Sector ^b | Type ^c | NPDES Permit |
|-----------------------------|------------|---------------------------|-------------|------------------------------|-------------------|--------------|
| MD | W. Shore | PAXTF | MWPTF | Agriculture-CAFO | Agg. WLA | |
| | | | | Agriculture-CAFO | Ind. WLA | MD356913 |
| | | | | Agriculture | LA | |
| | | | | Subtotal: Agriculture | | |
| | | | | Wastewater: POTW#1 | Ind. WLA | MD012452 |
| | | | | Wastewater: POTW#2 | Ind. WLA | MD013943 |
| | | | | Wastewater: Indus #1 | Ind. WLA | MD821672 |
| | | | | Wastewater: Indus #2 | Ind. WLA | MD853653 |
| | | | | Subtotal: Wastewater | | |
| | | | | Onsite | LA | |
| | | | | Urb/Suburb Runoff: MS4 | Agg. WLA | MD546195 |
| | | | | Urb/Suburb Runoff: Non-MS4 | LA | |
| | | | | Urb/Suburb Runoff: MS4 | Ind. WLA | MD892645 |
| | | | | Industrial Stormwater | Agg. WLA | |
| | | | | Industrial Stormwater | Ind. WLA | MD246139 |
| Construction | Agg. WLA | | | | | |
| Subtotal: Urb/Suburb | | | | | | |
| | | | Forest | LA | | |
| MD | W. Shore | SEVMH | MWSeM | Agriculture-CAFO | Agg. WLA | MD382614 |
| | | | | Agriculture | LA | |
| | | | | Subtotal: Agriculture | | |
| | | | | Wastewater: POTW#1 | Ind. WLA | MD083699 |
| | | | | Wastewater: POTW#2 | Ind. WLA | MD054732 |
| | | | | Wastewater: Indus #1 | Ind. WLA | MD836679 |
| | | | | Wastewater: Indus #2 | Ind. WLA | MD854469 |
| | | | | Subtotal: Wastewater | | |
| | | | | Onsite | LA | |
| | | | | Urb/Suburb Runoff: MS4 | Agg. WLA | MD588578 |
| Urb/Suburb Runoff: Non-MS4 | LA | | | | | |
| Subtotal: Urb/Suburb | | | | | | |
| | | | Forest | LA | | |
| ... | | | | | | |
| MD | W. Shore | | | Reserve for Growth | WLA/LA | |
| MD | W. Shore | | MW | Total | | |

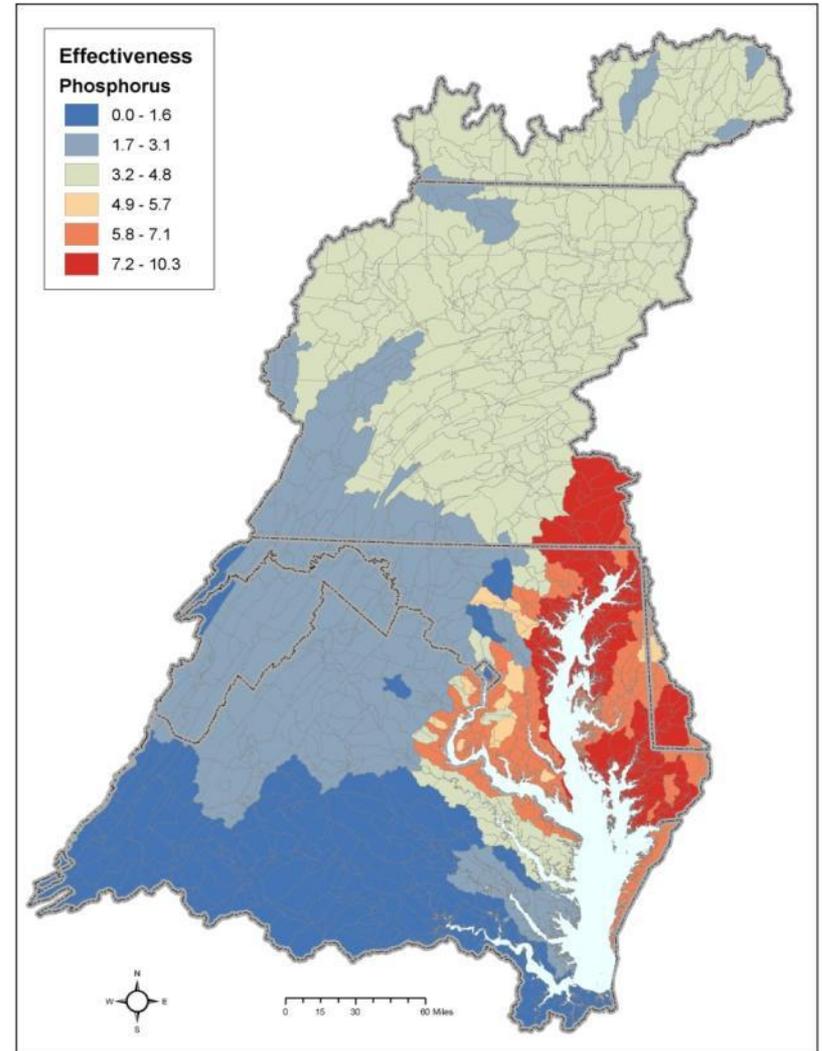
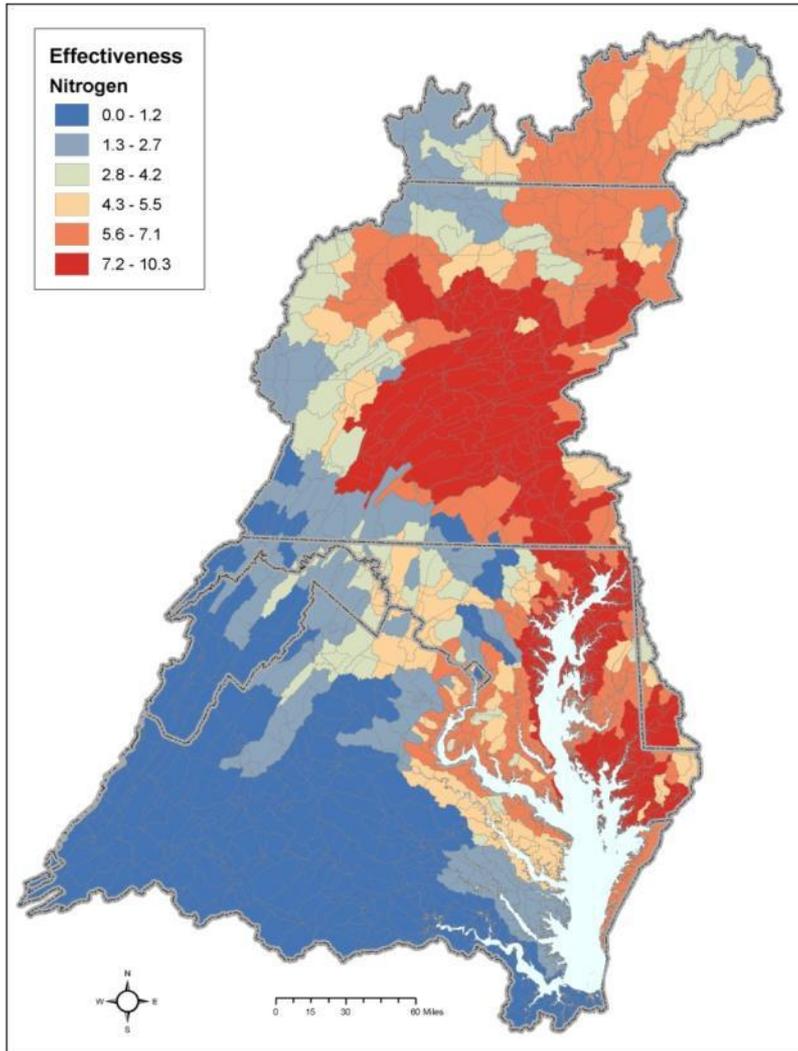
Land Areas of the Chesapeake Bay Basin Draining into the 92 303d Segments



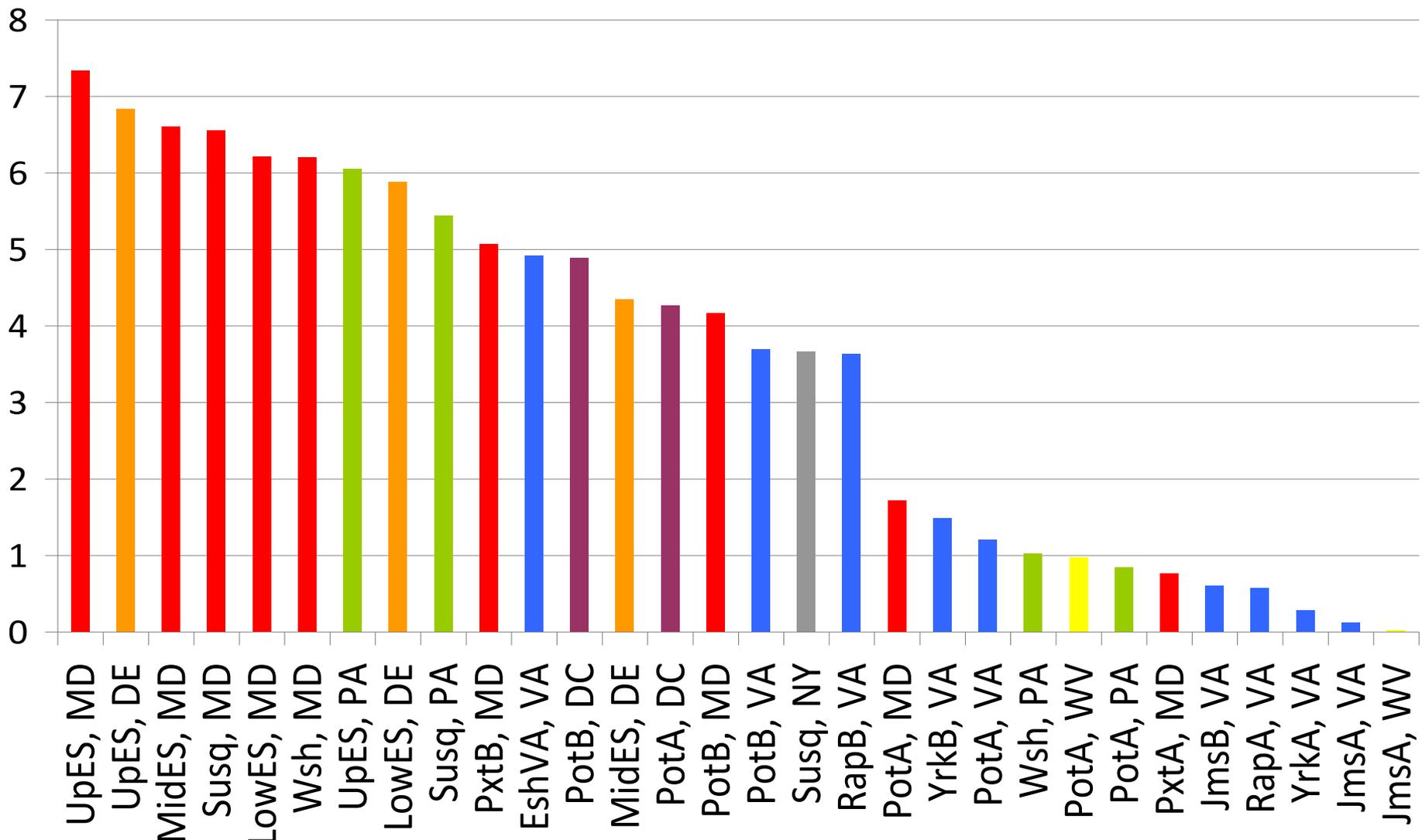
Note: Land areas do not reflect the actual area draining into a segment with 100% accuracy but are basically correct at the map scale.

LOCATION OF INCREASES IN POLLUTANT LOADS MATTERS!

Relative Effect of a Pound of Pollution on Bay Water Quality



Major River Basin by Jurisdiction Relative Impact on Bay WQ



Progress and Path Forward

- **Nitrogen Load Reductions**

- **27.1 % progress since 1985** in the face of substantial watershed growth and development (26% pop increase)
- **The Path Forward: 25%** further reduction from 2009 levels over the next **14 years (2025)** while holding the line*

- **Phosphorus Load Reductions**

- **31.5% progress since 1985** in the face of substantial growth
- **The Path Forward: 24%** further reduction from 2009 levels over the next **14 years** and holding the line*

*Offsetting new and increased loadings in the interim

EPA Guidance on Offsets

- Set aside an allocation for future new or increased nitrogen, phosphorus, and sediment loads [OR]
- “The jurisdiction will ‘offset’ any new or increased nutrient and sediment loads by a reduction elsewhere that would **account for the entire delivered nutrient and sediment loads after accounting for location of the sources, delivery factors, equivalency of pollutants, and the certainty of any such reductions.**”

EPA Guidance on Offsets

- “Where a jurisdiction’s progress toward implementing strategies is not on schedule to ensure that nutrient and sediment controls are in place by 2017 and 2025 to meet interim and final target loads, EPA would expect any new or increased nutrient and sediment loads to be compensated for by a **‘net improvement offset’ that quickens the pace of implementing controls** to meet Bay water quality standards.”
- “As EPA uses the term, ‘a net improvement offset ratio’ is an offset ratio **greater than merely accounting for the entire delivered load.**”

EPA Guidance on Offsets

- “EPA believes that a “net improvement offset for any new or increasing discharges will help achieve load reductions and meet the Bay’s water quality standards more quickly than an offset that merely accounts for the delivered load.”
- “EPA expects that WIPs will describe how a program for managing offsets or ‘net improvement offsets’ to meet water quality standards **will be structured and enforced.**”

EPA Guidance on Offsets

- In particular, EPA expects jurisdictions to describe how any offsets would address the following:
 - Consistency
 - Sustainability
 - Quantifiable
 - Enforceable
 - Authority
 - Progress

EPA Guidance on Offsets

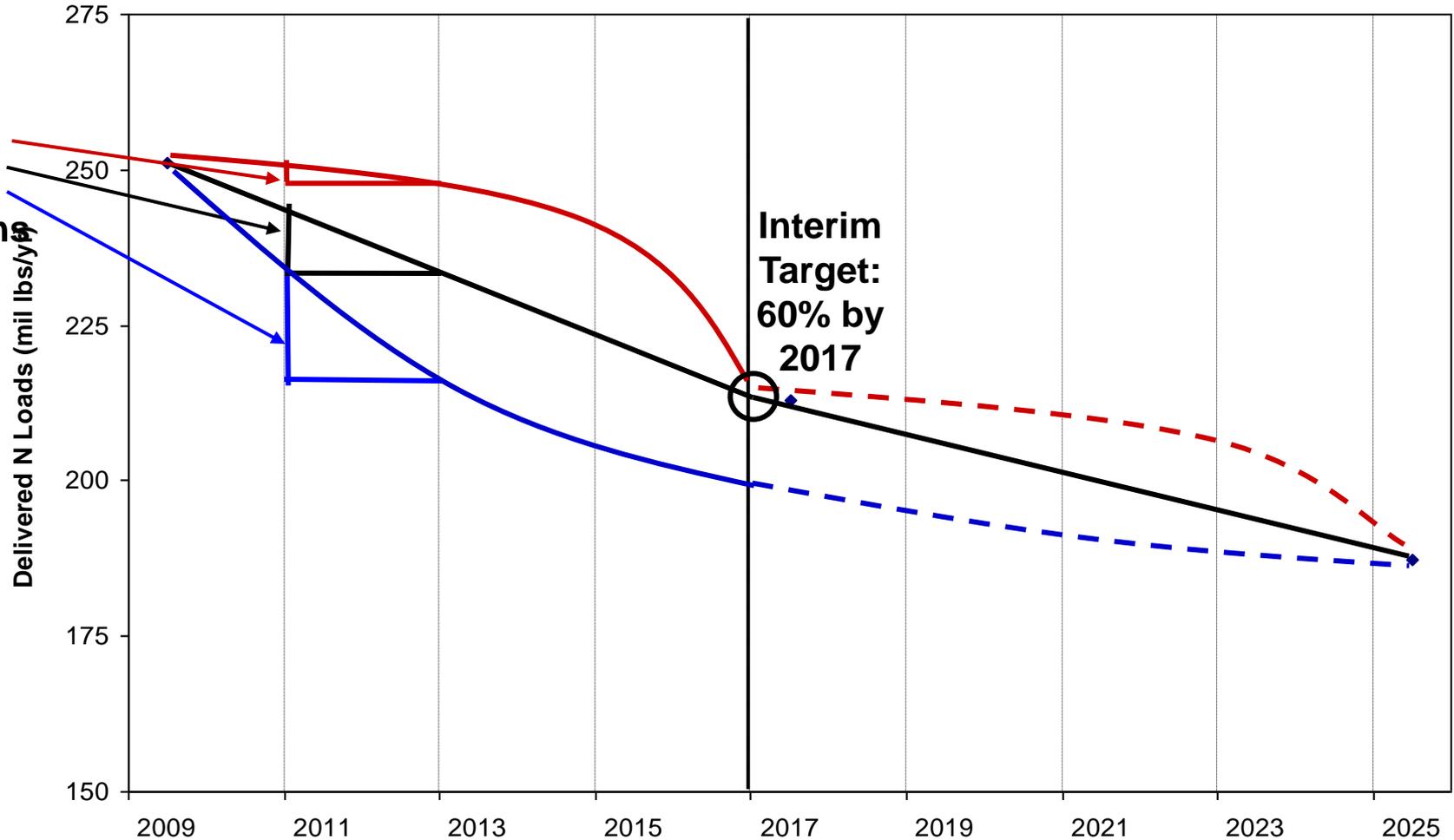
- “If a Bay jurisdiction has not chosen to explicitly reserve pollutant loading for new or increased point or nonpoint sources of nitrogen, phosphorus, and sediment in their WIP, does not provide a credible strategy to offset new or increased point or nonpoint loads, or fails to offset new or increased loads, **EPA may take actions as described in the EPA letter of December 29, 2009.**”

We have the tools to evaluate the effect of policies, plans, and strategies that concentrate growth in areas with adequate supporting infrastructure minimize future increases in impervious surfaces, lawns, and wastewater loads associated with population growth....let's just do it!



Two-Year Milestones and 2017

EPA Will Assess if Milestone Reduction on Schedule



- Assumes Upfront Program-Building and Future Reductions**
- Assumes Constant Reduction Over Time**
- Assumes Upfront Low-Hanging Fruit and More Difficult Future Reductions**

Recommended Reading

U.S. EPA . 2010. Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus, and Sediment. December 29, 2010, Philadelphia, PA. (Section 10 pages 10-1 to 10-3; Appendix S)

U.S. EPA. 2010. A Guide for EPA's Evaluation of Phase I Watershed Implementation Plans. April 2, 2010, Philadelphia, PA. (pages 3-4)

U.S. EPA. 2009. Letter from Region 3 Administrator Shawn M. Garvin to Secretary L. Preston Bryant, Virginia Department of Natural Resources, December 29, 2009.

U.S. EPA. 2009. Letter from Region 3, Acting Administrator William C. Early to Secretary L. Preston Bryant, Virginia Department of Natural Resources, November 3, 2009.



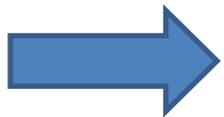
Questions



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